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NOTEWORTHY COLLECTION

California

Porphyra suborbiculata Kjellman 1897:10–13 (BANGIACEAE).—Marin Co., epizoic on barnacles attached to pilings in the upper intertidal at Nick's Cove, Tomales Bay, 38°11′57.42″N, 122°55′16.40″W, thalli sterile and fertile, 12 May 2011, *J. R. Hughey s.n.* (UC 1966687, UC 1966688) and 20 July 2011, *J. R. Hughey s.n.* (UC 1966689).

Previous knowledge. *Porphyra suborbiculata* is naturally distributed throughout Asia (type locality: Gotoretto, Nagasaki Prefecture, Japan (Silva et al. 1996) and reportedly also occurs naturally in the Indian Ocean, Australia, and New Zealand (Broom et al. 2002). However, based on recent molecular evidence some *P. suborbiculata* from Australia and New Zealand, as well as North America (Mexico and the Atlantic coast of North America) represent introduced populations (Broom et al. 2002; Klein et al. 2003; Neefus et al. 2008). The occurrence of this seaweed in areas associated with increased shipping activity suggest that its numerous introductions were the result of hitchhikings on the hulls of seagoing vessels (Broom et al. 2002). In the eastern Pacific, *P. suborbiculata* was first collected in 1985 from Baja California, Mexico (Aguilar-Rosas and Aguilar-Rosas 2003). Although *P. suborbiculata* shows some variation in morphology, it is generally characterized as being a relatively small (0.5–4 cm in diameter), monostromatic alga, with brownish red to pink, or bronze and violet colored blades that are ovate to cordate or reniform in shape (Broom et al. 2002; Aguilar-Rosas and Aguilar-Rosas 2003; Neefus et al. 2008).

Significance. First report of *P. suborbiculata* in California. The gametophytic thalli collected from Tomales Bay are in agreement with descriptions and illustrations of this species. Specimens from California are cordate at the base, and ovate to deeply reniform in shape. The margins are slightly ruffled and appear dentate to the unaided eye. Under microscopic examination thalli show the diagnostic marginal teeth. The blade color is reddish-brown in spring and steel greenish in summer, and fronds are more or less equal in width and height, measuring to 1.8 cm. Spot checks for this alga at Marshall and Marconi failed to yield additional specimens. Identification of this invasive species was confirmed using *rbc*L (GenBank JN413680) and ITS-1 (GenBank JN413679) DNA sequences. The *rbc*L sequence was identical to two sequences from Japan (Kanagawa, Yokosuka, Sajima and Yamaguchi, Shimonoseki, Tsunoshima) and differed from others in the database by 2 or more bp. The ITS-1 sequence was identical to fifteen other sequences deposited in GenBank representing populations from around the world. Since the *rbc*L sequence generated for *P. suborbiculata* from Tomales Bay matches specimens from Japan and the ITS-1 sequence is identical to other invasive populations of this species from Australia, Baja California, New Zealand, and the western Atlantic, it is concluded that the population from California is also the result of an introductory event. In Tomales Bay, *P. suborbiculata* joins a list of five other non-native algae: *Caulacanthus ustulatus* (Turner) Kützing, *Codium fragile* subsp. *tomentosoides* (van Goor) P. C. Silva, *Gelidium vagum* Okamura, *Lomentaria hakodatensis* Yendo, and *Sargassum muticum* (Yendo) Fensholt (C. K. Kjeldsen, Sonoma State University, unpublished data; Hughey 1995; Hughey et al. 1996). The mariculture of oysters in Tomales Bay began around 1907 (Barrett 1963), and oysters are the likely vector for the introduction of *P. suborbiculata* in the bay.

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